Resident Curriculum
PL-3
PICU

Patient Care

The competency of patient care includes:

- communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- gather essential and accurate information about their patients
- make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- develop and carry out patient management plans counsel and educate patients and their families
- use information technology to support patient care decisions and patient education
- perform competently all medical and invasive procedures considered essential for the area of practice
- provide health care services aimed at preventing health problems or maintaining health
- work with health care professionals, including those from other disciplines, to provide patient- focused care

GOAL 1: Resuscitation and Stabilization (PICU). Recognize the critically ill patient and initiate appropriate stabilization and/or resuscitative measures.

Objectives:

a. Explain and perform steps in resuscitation and stabilization, particularly airway management, volume replacement and resuscitative pharmacology.
b. Describe the common causes of acute deterioration in the previously stable patient in the PICU.
c. Function appropriately in codes and resuscitations as part of the PICU team.

GOAL 2: Common Signs and Symptoms (PICU). Evaluate and manage, under the supervision of an intensivist, common signs and symptoms seen in critically ill infants, children and adolescents in the intensive care setting.

Objectives:

Evaluate and manage, under supervision of an intensivist, patients with signs and symptoms that present commonly to the intensive care unit (examples below).

1. Cardiovascular: acute life-threatening event, bradycardia, cardiopulmonary arrest, congestive heart failure, cyanosis, hypertension, hypotension, poor capillary perfusion, rhythm disturbances, tachycardia.
2. Endocrine: signs and symptoms suggestive of hypo- and hypotension, poor capillary perfusion, rhythm disturbances, tachycardia.
3. GI: abdominal distension, hematemesis and melena, icterus, peritoneal signs, vomiting.
4. Hematologic: pallor, petechiae, purpura, uncontrolled bleeding.
5. Infectious Diseases: endotoxic shock, fever.
6. Neurologic: acute weakness, altered mental status, coma, delirium, encephalopathy, seizures, tetany, thermoregulatory abnormalities.

7. Renal: anuria, hematuria, oliguria, polyuria, severe electrolyte disturbance.
8. Respiratory: apnea, cyanosis, dyspnea, hemoptysis, hypercarbia, hyperpnea, hypoxemia, increased or decreased respiratory effort, poor air movement, pulmonary adema, respiratory failure, stridor, tachypnea, wheezing.

Goal 3: **Common Conditions (PICU).** Recognize and manage, under the supervision of an intensivist, conditions that commonly present to the intensive care unit, using consultation when appropriate.

Evaluate and manage, under the supervision of an intensivist, patients with conditions that present commonly to the intensive care unit (examples below).

1. General: burns (thermal, electrical), common intoxications, drug overdose, shock (cardiogenic, hypovolemic, distributive, toxic), inhalation injury, malignant hyperthermia, non-accidental trauma, submersion injury, toxic or caustic ingestion or inhalation injury, toxic shock syndrome

2. Allergy Immunology: anaphylaxis, life-threatening angioedema, Stevens Johnson Syndrome

3. Cardiovascular: arrhythmias, cardiac tamponade, congestive heart failure, cyanotic congenital heart disease, malignant hypertension, myocarditis/ cardiomyopathy

4. Endocrine: diabetes insipidus and adrenal insufficiency/crisis, diabetic ketoacidosis, hypo- and hyperglycemia, syndrome of inappropriate antidiuretic hormone (SIADH)

5. Fluids, electrolytes, metabolic: inborn errors of metabolism, severe dehydration (hyper-, normo-, or hyponatremic), severe acid-base disturbances, severe electrolyte disturbance

6. GI/Surgery: abdominal trauma (blunt/penetrating), acute abdomen, acute GI bleeding, fulminant hepatic dysfunction, hepatic dysfunction, pancreatitis, pre- and post-operative management, stress ulcer

7. Hematologic: anemia (severe), disseminated intravascular coagulopathy (DIC), Deep venous thrombosis (DVT), neutropenia, sickle crisis, polycythemia, thrombocytopenia, tumor lysis syndrome

8. Infectious disease: encephalitis, infant botulism, meningitis, nosocomial infections, sepsis

9. Neurologic: acute increased intracranial pressure, brain death, cerebral edema, cerebrovascular accident (CVA), coma, encephalopathy, Guillain-Barre, head injury, spinal muscle atrophy, status epilepticus

10. Pulmonary: acute respiratory distress syndrome (ARDS), epiglottitis, pulmonary edema, pneumothorax, respiratory failure/impending respiratory failure, severe croup and bacterial tracheitis, status asthmaticus, upper airway obstruction (infectious, structural, foreign body)

11. Renal: acute renal failure, hemolytic uremic syndrome

GOAL 4: Technical and therapeutic procedures. Describe the following procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

1. Anesthesia/analgesia: conscious sedation
2. Anesthesia/analgesia: pain management
3. Arterial puncture
4. Bladder: catherization
5. Burn: acute stabilization of major burn
6. Cardioversion/defibrillation

7. Central line: use/care
8. Chest physiotherapy
9. Chest tube placement
10. Endotracheal intubation
11. Endotracheal intubation: rapid sequence intubation
12. Gastric lavage
13. Gastric tube placement (OG/NG)
14. Gastrostomy tube replacement
15. Intravenous line placement
16. Intraosseous line placement
17. Lumbar puncture
18. Medication delivery: endotracheal
19. Medication delivery: IM/SC/ID
20. Medication delivery: inhaled
21. Medication delivery: IV
22. Medication delivery: rectal
23. Pulmonary function tests: peak flow meter
24. Pulse oximeter: placement
25. Seldinger technique
26. Sterile technique
27. Suctioning: tracheostomy
28. Thoracentesis
29. Tracheostomy tube: replacement
30. Ventilation: bag-valve-mask
31. Ventilation support: initiation
32. V-P shunt external taps

GOAL 5: Diagnostic and screening procedures. Describe the following tests or procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

1. ECG: emergency interpretation
2. ECG: perform
3. Electroencephalogram (EEG)
4. Monitoring interpretation: cardiac
5. Monitoring interpretation: pulse oximetry
6. Monitoring interpretation: respiratory
7. Monitoring interpretation: Capnometry/end-tidal CO2
8. Radiologic interpretation: abdominal ultrasound
9. Radiologic interpretation: abdominal X-ray
10. Radiologic interpretation: cervical spine X-ray
11. Radiologic interpretation: chest X-ray
12. Radiologic interpretation: CT of head
13. Radiologic interpretation: extremity X-ray
14. Radiologic interpretation: GI contrast study
15. Radiologic interpretation: lateral neck X-ray
16. Radiologic interpretation: MRI of head
17. Radiologic interpretation: renal ultrasound
18. Radiologic interpretation: skeletal X-ray (incl. abuse)
19. Radiologic interpretation: skull film for fracture

Medical Knowledge

The competency of Medical Knowledge includes:

● demonstrate an investigatory and analytic thinking approach to clinical situations
● know and apply the basic and clinically supportive sciences which are appropriate to their discipline

Goal 1: **Diagnostic Testing (PICU).** Utilize common diagnostic tests and imaging studies appropriately in the intensive care unit, obtaining consultation as indicated for interpretation of results.

Demonstrate understanding of common diagnostic tests and imaging studies used in the PICU by being able to:

- Explain the indications for and limitations of each study.
- Know or be able to locate readily age-appropriate normal ranges (lab studies).
- Apply knowledge of diagnostic test properties, including the use of sensitivity, specificity, positive predictive value, negative predictive value, likelihood ratios, and receiver operating characteristic curves, to assess the utility of tests in various clinical settings
- Discuss cost and utilization issues.
- Interpret the results in the context of the specific patient.
- Discuss therapeutic options for correction of abnormalities.
- Use appropriately the following laboratory and imaging studies when indicated for patients in the PICU setting:

1. CBC with differential, platelet count, RBC indices
2. Blood chemistries: electrolytes, glucose, calcium, magnesium, phosphate
3. Renal function tests
4. Tests of hepatic function (PT, albumin) and damage (ammonia, bilirubin, liver enzymes)
5. Serologic tests for infection (e.g., hepatitis, HIV)
6. C-reactive protein, erythrocyte sedimentation rate
7. Therapeutic drug concentrations
8. Coagulation studies: platelets, PT/PTT, fibrinogen, FSP, D-dimers, "DIC screen"
9. Arterial, capillary, and venous blood gases
10. Detection of bacterial, viral, and fungal pathogens
11. Urinalysis
12. CSF analysis
13. Gram stain
14. Stool studies
15. Toxicologic screens/drug levels
16. Other fluid studies (e.g., pleural fluid, joint fluid)
17. Chest X-ray
18. Abdominal series
19. Skeletal survey
20. Cervical spine films
21. CT scans of abdomen, chest and head
22. MRI scans
23. Basic concepts of cerebral blood flow studies

Goal 2: **Monitoring and Therapeutic Modalities (PICU).** Understand how to use the physiologic monitoring, special technology and therapeutic modalities used commonly in the intensive care setting.

- Demonstrate understanding of the monitoring techniques and special treatments commonly used in the PICU by being able to:
- Demonstrate understanding of the monitoring techniques and special treatments commonly used in the PICU by being able to:

1. Discuss the indications, contraindications and complications
2. Have a basic understanding of the general techniques (e.g., Seldinger technique for central venous line placement)
3. Interpret the results of monitoring

- Use appropriately the following monitoring techniques in the intensive care unit under supervision of an intensivist:

1. Central venous pressure monitoring
2. Invasive arterial blood pressure monitoring
3. Intracranial pressure monitoring
4. Pulse oximetry End-tidal carbon dioxide monitoring

- Use appropriately or be familiar with the following treatments and techniques in the intensive care unit, including monitoring effects and anticipating potential complications specific to each therapy:

1. Oxygen administration by cannula, masks, hood
2. Positive pressure ventilation, including non-invasive modalities such as nasal/mask BiPAP/CPAP, bag and mask ventilation
3. Principles of ventilator management, intubation and extubation procedures and criteria
4. Analgesics, sedatives, and paralytics
5. Enteral and parenteral nutrition
6. Blood and blood product transfusions
7. Vasoactive drugs (pressors and inotropes)

Practice- Based Learning and Improvement

The competency of Practice- Based Learning and Improvement includes:

- analyze practice experience and perform practice-based improvement activities using a systematic methodology
- locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
- obtain and use information about their own population of patients and the larger population from which their patients are drawn
- apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
- use information technology to manage information, access on-line medical information; and support their own education
- facilitate the learning of students and other health care professionals

Systems Based Practice

The competency of System Based Practice includes:

- understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice

● know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources

● practice cost-effective health care and resource allocation that does not compromise quality of care

● advocate for quality patient care and assist patients in dealing with system complexities

● know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

Professionalism

The competency of Professionalism includes:

● demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development

● demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices

● demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

Interpersonal and Communication Skills

The competency of interpersonal and communication skills include:

● create and sustain a therapeutic and ethically sound relationship with patients

● use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills

● work effectively with others as a member or leader of a health care team or other professional groups.